

Appendix G

Air Quality and Greenhouse Gas Emissions Calculations

1. OPERATION CRITERIA POLLUTANT EMISSIONS SUMMARY

9.5 MGD Project Operational Emissions

Source	ROG	NOx	PM10	PM2.5	CO
On-road Exhaust	0.10	1.73	0.10	0.05	2.73
Emergency Generator Testing	0.79	43.90	1.28	1.18	2.78
Total	0.89	45.63	1.38	1.23	5.51
Significance Criteria	137	137	82	---	---
Significant Impact?	No	No		NO	NO

6.1 MGD Project Operational Emissions

Source	ROG	NOx	PM10	PM2.5	CO
On-road Exhaust	0.10	1.73	0.10	0.05	2.73
Emergency Generator Testing	0.74	37.00	1.08	1.00	2.48
Total	0.84	38.73	1.18	1.05	5.21
Significance Criteria	137	137	82	---	---
Significant Impact?	No	No	No	NO	NO

2. CONSTRUCTION CRITERIA POLLUTANT EXHAUST EMISSIONS

Maximum Day Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Desal Plant Total Exhaust Emissions (pounds/day)	8.63	131.67	5.04	4.25
Slant Wells, Electrical Conduit, and Electrical Control Building Total Exhaust Emissions (pounds/day)	4.96	66.65	2.68	2.33
Desal Water Pipeline Total Exhaust Emissions (pounds/day)	3.36	43.40	1.89	1.65
Monterey Pipeline Total Exhaust Emissions (pounds/day)	3.45	44.63	1.92	1.68
Terminal Reservoir and ASR Pump Station (pounds/day)	3.38	50.55	1.93	1.59
ASR Injection/Extraction Wells and ASR Settling Basin (pounds/day)	4.50	63.26	2.45	2.08
Total (pounds/day)	28.28	400.16	15.91	13.58

Notes: See Estimated Construction Phasing schedule

Maximum Day Total Unmitigated Construction Emissions

Emissions Source	ROG	NOx	PM10	PM2.5
Equipment and Vehicle Exhaust	28.28	400.16	15.91	13.58
Fugitive Dust	--	--	217.64	30.60
Total	28.28	400.16	233.55	44.18

For fugitive dust emission calculations, refer to 3, Fugitive Dust.

Maximum Day Total Mitigated Construction Emissions

Emissions Source	ROG	NOx	PM10	PM2.5
Equipment and Vehicle Exhaust	28.28	400.16	15.91	13.58
Fugitive Dust	--	--	46.78	9.49
Total	28.28	400.16	62.69	23.07

For fugitive dust emission calculations, refer to 3, Fugitive Dust.

Desalination Plant Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions (pounds/day)

Project Component	ROG	NOx	PM10	PM2.5
Desal Plant Total Exhaust Emissions (pounds/day)	8.63	131.67	5.04	4.25

Average Daily Offroad Equipment Construction Exhaust Emissions

Off Road Equipment	Approx. HP	Number	Hour/Day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Paver	160	1	12	21	0.066	0.706	0.035	16.55	177.87	8.84	8.18
Rollers	90	2	12	63	0.047	0.417	0.031	71.43	630.71	46.44	42.96
Excavator	200	2	12	42	0.050	0.675	0.021	50.88	679.98	21.47	19.86
Loader	90	2	12	42	0.038	0.345	0.027	38.11	348.05	26.80	24.79
Backhoe	150	2	12	462	0.048	0.649	0.033	528.15	7,190.79	364.45	337.12
Cranes	200	2	12	462	0.090	1.017	0.046	996.29	11,279.43	511.82	473.43
Graders	200	1	12	42	0.077	1.043	0.034	38.68	525.51	17.07	15.79
Off-Highway Trucks	350	1	12	42	0.115	1.269	0.048	58.11	639.71	24.13	22.32
Off-Highway Tractor	200	1	12	42	0.077	1.012	0.035	38.84	510.14	17.68	16.35
Forklifts	150	4	12	462	0.025	0.369	0.014	556.55	8,172.35	316.91	293.15
Water Truck	350	1	4	420	0.115	1.269	0.048	193.71	2,132.37	80.45	74.41
Generator	200	2	12	525	0.079	1.049	0.039	997.68	13,216.78	487.32	450.77
Total lbs.								3,585.00	45,503.68	1,923.38	1,779.13
Ave. Daily								6.83	86.67	3.66	3.39

Notes: Construction would occur over 25 months with three main activities: site preparation (2 months); plant development and construction (22 months); site paving (1 month). There would be approximately 21 workdays per month. Construction activities would occur around the clock, with average equipment usage at 12 hours per day.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	194	10	0.0002	0.0007	1.1E-04	4.5E-05	0.43	1.28	0.20	0.09
Heavy duty truck	110	25	0.0005	0.0159	4.3E-04	2.8E-04	1.37	43.71	1.17	0.77
Total lbs/day							1.80	45.00	1.38	0.86

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Slant Wells, Pump-to-Waste PL, Electrical Conduit, and Electrical Control Building Construction Exhaust Emissions - Both 9.5 and 6.1 MGD Projects

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Slant Wells, Pump-to-Waste PL, Electrical Conduit, and Electrical Control Building Total Exhaust Emissions (pounds/day)	4.96	66.65	2.68	2.33

Average Daily Offroad Equipment Construction Exhaust Emissions - 9.6 MGD Project

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Bore/Drill Rigs	350	1	24	90	0.069	0.971	0.030	149.60	2,096.88	64.71	59.86
Crane	200	2	12	378	0.090	1.017	0.046	815.15	9,228.62	418.76	387.35
Trencher	150	1	12	378	0.097	1.036	0.052	440.75	4,701.44	236.94	219.17
Generator	200	2	12	90	0.079	1.049	0.039	171.03	2,265.73	83.54	77.27
Excavators	200	1	12	90	0.050	0.675	0.021	54.51	728.55	23.00	21.28
Total								1,631.04	19,021.21	826.95	764.93
Ave. Daily								4.31	50.32	2.19	2.02

Notes: Construction of the 9.5 MGD project would last 18 months and would occur in three phases: drilling (10 days for each of the nine wells); well development (10 days each well); electrical and pump-to-waste pipeline (1 month). Construction of the 6.1 MGD project would last approximately 14 months and would occur in three phases: drilling (10 days for each of the seven wells); well development (10 days each well); electrical and pump-to-waste pipeline (1 month). Although overall construction emissions associated with the 6.1 MGD project would be less than the emissions for the 9.5 MGD project, the average daily emissions shown above represent both the 9.5 MGD and 6.1 MGD projects. There would be approximately 21 workdays per month. Drilling-related activities would occur around the clock, with drill usage at 24 hours per day and the usage for other equipment at 12 hours per day.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	66	10	0.0002	0.0007	1.1E-04	4.5E-05	0.15	0.44	0.07	0.03
Heavy duty truck	40	25	0.0005	0.0159	4.3E-04	2.8E-04	0.50	15.90	0.43	0.28
Total lbs/day							0.65	16.33	0.50	0.31

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Source Water Pipeline Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Source Water Pipeline Total Exhaust Emissions (pounds/day)	3.41	44.01	1.91	1.66

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	126	0.066	0.706	0.035	49.64	533.62	26.52	24.53
Rollers	90	1	6	126	0.047	0.417	0.031	35.71	315.35	23.22	21.48
Backhoe	150	1	8	126	0.048	0.512	0.026	48.01	516.20	26.16	24.20
Excavators	200	1	8	126	0.050	0.675	0.021	50.88	679.98	21.47	19.86
Cranes	200	1	6	126	0.090	1.017	0.046	67.93	769.05	34.90	32.28
Jack-and-Bore Rig	350	1	8	10	0.069	0.971	0.030	5.54	77.66	2.40	2.22
Loader	90	1	8	126	0.038	0.345	0.027	38.11	348.05	26.80	24.79
Generator	200	1	8	126	0.079	1.049	0.039	79.81	1,057.34	38.99	36.06
Total								375.65	4,297.25	200.45	185.41
Ave. Daily								2.98	34.11	1.59	1.47

Notes: Construction would last 6 months. There would be 10 days of jack-and-boring at the Highway 1 crossing. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	56	10	0.0002	0.0007	1.1E-04	4.5E-05	0.12	0.37	0.06	0.03
Heavy duty truck	24	25	0.0005	0.0159	4.3E-04	2.8E-04	0.30	9.54	0.26	0.17
Total lbs/day							0.42	9.91	0.31	0.19

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Salinas Valley Return and Brine Discharge Pipelines Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Salinas Valley Return and Brine Discharge Pipelines Total Exhaust Emissions (pounds/day)	3.15	38.44	1.73	1.55

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	126	0.066	0.706	0.035	49.64	533.62	26.52	24.53
Rollers	90	1	6	126	0.047	0.417	0.031	35.71	315.35	23.22	21.48
Backhoe	150	1	8	126	0.048	0.512	0.026	48.01	516.20	26.16	24.20
Excavators	200	1	8	126	0.050	0.675	0.021	50.88	679.98	21.47	19.86
Cranes	200	1	6	126	0.090	1.017	0.046	67.93	769.05	34.90	32.28
Loader	90	1	8	126	0.038	0.345	0.027	38.11	348.05	26.80	24.79
Generator	200	1	8	126	0.079	1.049	0.039	79.81	1,057.34	38.99	36.06
Total								370.11	4,219.59	198.05	183.20
Ave. Daily								2.94	33.49	1.57	1.45

Notes: Construction would last 6 months. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	28	10	0.0002	0.0007	1.1E-04	4.5E-05	0.06	0.19	0.03	0.01
Heavy duty truck	12	25	0.0005	0.0159	4.3E-04	2.8E-04	0.15	4.77	0.13	0.08
Total lbs/day							0.21	4.95	0.16	0.10

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute

Desalinated Water Pipeline Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Desal Water Pipeline Total Exhaust Emissions (pounds/day)	3.36	43.40	1.89	1.65

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	126	0.066	0.706	0.035	49.64	533.62	26.52	24.53
Rollers	90	1	6	126	0.047	0.417	0.031	35.71	315.35	23.22	21.48
Backhoe	150	1	8	126	0.048	0.512	0.026	48.01	516.20	26.16	24.20
Excavators	200	1	8	126	0.050	0.675	0.021	50.88	679.98	21.47	19.86
Cranes	200	1	6	126	0.090	1.017	0.046	67.93	769.05	34.90	32.28
Loader	90	1	8	126	0.038	0.345	0.027	38.11	348.05	26.80	24.79
Generator	200	1	8	126	0.079	1.049	0.039	79.81	1,057.34	38.99	36.06
Total								370.11	4,219.59	198.05	183.20
Ave. Daily								2.94	33.49	1.57	1.45

Notes: Construction would last 6 months. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	56	10	0.0002	0.0007	1.1E-04	4.5E-05	0.12	0.37	0.06	0.03
Heavy duty truck	24	25	0.0005	0.0159	4.3E-04	2.8E-04	0.30	9.54	0.26	0.17
Total lbs/day							0.42	9.91	0.31	0.19

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Transmission Main Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Transmission Main Total Exhaust Emissions (pounds/day)	3.47	44.94	1.93	1.69

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	126	0.066	0.706	0.035	49.64	533.62	26.52	24.53
Rollers	90	1	6	126	0.047	0.417	0.031	35.71	315.35	23.22	21.48
Backhoe	150	1	8	126	0.048	0.512	0.026	48.01	516.20	26.16	24.20
Excavators	200	1	8	126	0.050	0.675	0.021	50.88	679.98	21.47	19.86
Cranes	200	1	6	126	0.090	1.017	0.046	67.93	769.05	34.90	32.28
Jack-and-Bore Rig	350	1	8	25	0.069	0.971	0.030	13.85	194.16	5.99	5.54
Loader	90	1	8	126	0.038	0.345	0.027	38.11	348.05	26.80	24.79
Generator	200	1	8	126	0.079	1.049	0.039	79.81	1,057.34	38.99	36.06
Total								383.96	4,413.75	204.04	188.74
Ave. Daily								3.05	35.03	1.62	1.50

Notes: Construction would last 6 months. There would be 25 days of jack-and-boring at the two Highway 1 crossings and the crossing of Reservation Road. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	56	10	0.0002	0.0007	1.1E-04	4.5E-05	0.12	0.37	0.06	0.03
Heavy duty truck	24	25	0.0005	0.0159	4.3E-04	2.8E-04	0.30	9.54	0.26	0.17
Total lbs/day							0.42	9.91	0.31	0.19

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Monterey Pipeline Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Monterey Pipeline Total Exhaust Emissions (pounds/day)	3.45	44.63	1.92	1.68

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	252	0.066	0.706	0.035	99.29	1,067.24	53.03	49.05
Rollers	90	1	6	252	0.047	0.417	0.031	71.43	630.71	46.44	42.96
Backhoe	150	1	8	252	0.048	0.512	0.026	96.03	1,032.40	52.33	48.40
Excavators	200	1	8	252	0.050	0.675	0.021	101.76	1,359.95	42.94	39.72
Cranes	200	1	6	252	0.090	1.017	0.046	135.86	1,538.10	69.79	64.56
Jack-and-Bore Rig	350	1	8	40	0.069	0.971	0.030	22.16	310.65	9.59	8.87
Loader	90	1	8	252	0.038	0.345	0.027	76.23	696.10	53.60	49.58
Generator	200	1	8	252	0.079	1.049	0.039	159.63	2,114.68	77.97	72.12
Total								762.38	8,749.83	405.68	375.26
Ave. Daily								3.03	34.72	1.61	1.49

Notes: Construction would last 12 months. There would be 40 days of jack-and-boring at the Highway 1, Highway 218, and other crossings. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	56	10	0.0002	0.0007	1.1E-04	4.5E-05	0.12	0.37	0.06	0.03
Heavy duty truck	24	25	0.0005	0.0159	4.3E-04	2.8E-04	0.30	9.54	0.26	0.17
Total lbs/day							0.42	9.91	0.31	0.19

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Transfer Pipeline Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Transfer Pipeline Total Exhaust Emissions (pounds/day)	3.41	44.01	1.91	1.66

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	126	0.066	0.706	0.035	49.64	533.62	26.52	24.53
Rollers	90	1	6	126	0.047	0.417	0.031	35.71	315.35	23.22	21.48
Backhoe	150	1	8	126	0.048	0.512	0.026	48.01	516.20	26.16	24.20
Excavators	200	1	8	126	0.050	0.675	0.021	50.88	679.98	21.47	19.86
Cranes	200	1	6	126	0.090	1.017	0.046	67.93	769.05	34.90	32.28
Jack-and-Bore Rig	350	1	8	10	0.069	0.971	0.030	5.54	77.66	2.40	2.22
Loader	90	1	8	126	0.038	0.345	0.027	38.11	348.05	26.80	24.79
Generator	200	1	8	126	0.079	1.049	0.039	79.81	1,057.34	38.99	36.06
Total								375.65	4,297.25	200.45	185.41
Ave. Daily								2.98	34.11	1.59	1.47

Notes: Construction would last 6 months. There would be 10 days of jack-and-boring at the Fremont Boulevard and General Jim Moore Boulevard crossings. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	56	10	0.0002	0.0007	1.1E-04	4.5E-05	0.12	0.37	0.06	0.03
Heavy duty truck	24	25	0.0005	0.0159	4.3E-04	2.8E-04	0.30	9.54	0.26	0.17
Total lbs/day							0.42	9.91	0.31	0.19

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

ASR Conveyance and Pump to Waste Pipelines Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
ASR Conveyance Pipelines Total Exhaust Emissions (pounds/day)	3.36	43.40	1.89	1.65

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	126	0.066	0.706	0.035	49.64	533.62	26.52	24.53
Rollers	90	1	6	126	0.047	0.417	0.031	35.71	315.35	23.22	21.48
Backhoe	150	1	8	126	0.048	0.512	0.026	48.01	516.20	26.16	24.20
Excavators	200	1	8	126	0.050	0.675	0.021	50.88	679.98	21.47	19.86
Cranes	200	1	6	126	0.090	1.017	0.046	67.93	769.05	34.90	32.28
Jack-and-Bore Rig	350	0	0	0	0.069	0.971	0.030	0.00	0.00	0.00	0.00
Loader	90	1	8	126	0.038	0.345	0.027	38.11	348.05	26.80	24.79
Generator	200	1	8	126	0.079	1.049	0.039	79.81	1,057.34	38.99	36.06
Total								370.11	4,219.59	198.05	183.20
Ave. Daily								2.94	33.49	1.57	1.45

Notes: Construction would last 6 months. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	56	10	0.0002	0.0007	1.1E-04	4.5E-05	0.12	0.37	0.06	0.03
Heavy duty truck	24	25	0.0005	0.0159	4.3E-04	2.8E-04	0.30	9.54	0.26	0.17
Total lbs/day							0.42	9.91	0.31	0.19

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Terminal Reservoir and ASR Pump Station

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Terminal Reservoir, ASR Pump Station, and ASR Pump-to-Waste Pipeline (pounds/day)	3.38	50.55	1.93	1.59

Average Daily Offroad Equipment Construction Exhaust Emissions

Off Road Equipment	Approx. HP	Number	Hour/Day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	8	21	0.066	0.706	0.035	11.03	118.58	5.89	5.45
Rollers	90	1	8	63	0.047	0.417	0.031	23.81	210.24	15.48	14.32
Excavator	200	1	8	42	0.050	0.675	0.021	16.96	226.66	7.16	6.62
Loader	90	1	8	42	0.038	0.345	0.027	12.70	116.02	8.93	8.26
Backhoe	150	1	8	315	0.048	0.512	0.026	120.03	1,290.50	65.41	60.50
Cranes	200	2	8	315	0.090	1.017	0.046	452.86	5,127.01	232.64	215.20
Graders	200	1	8	42	0.077	1.043	0.034	25.79	350.34	11.38	10.53
Off-Highway Trucks	350	1	8	42	0.115	1.269	0.048	38.74	426.47	16.09	14.88
Off-Highway Tractor	200	1	8	42	0.077	1.012	0.035	25.90	340.09	11.79	10.90
Generator	200	1	8	378	0.079	1.049	0.039	239.44	3,172.03	116.96	108.18
Total lbs.								967.27	11,377.93	491.73	454.85
Ave. Daily								2.56	30.10	1.30	1.20

Notes: Construction would last 18 months and occur with three main activities: site preparation (2 months); plant development and construction (15 months); site paving (1 month). There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	88	10	0.0002	0.0007	1.1E-04	4.5E-05	0.20	0.58	0.09	0.04
Heavy duty truck	50	25	0.0005	0.0159	4.3E-04	2.8E-04	0.62	19.87	0.53	0.35
Total lbs/day							0.82	20.45	0.63	0.39

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

ASR Injection/Extraction Wells and ASR Settling Basin Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
ASR Injection/Extraction Wells and ASR Settling Basin (pounds/day)	4.50	63.26	2.45	2.08

Average Daily Offroad Equipment Construction Exhaust Emissions

Off Road Equipment	Approx. HP	Number	Hour/Day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	8	5	0.066	0.706	0.035	2.63	28.23	1.40	1.30
Rollers	90	1	8	47	0.047	0.417	0.031	17.76	156.84	11.55	10.68
Excavator	200	1	8	42	0.050	0.675	0.021	16.96	226.66	7.16	6.62
Loader	90	1	8	210	0.038	0.345	0.027	63.52	580.08	44.66	41.31
Backhoe	150	1	8	210	0.048	0.512	0.026	80.02	860.33	43.60	40.33
Drill Rig	350	1	24	40	0.069	0.971	0.030	66.49	931.95	28.76	26.60
Cranes	200	2	8	210	0.090	1.017	0.046	301.91	3,418.01	155.10	143.46
Graders	200	1	8	42	0.077	1.043	0.034	25.79	350.34	11.38	10.53
Off-Highway Trucks	350	1	8	210	0.115	1.269	0.048	193.71	2,132.37	80.45	74.41
Off-Highway Tractor	200	1	8	42	0.077	1.012	0.035	25.90	340.09	11.79	10.90
Generator	200	1	8	210	0.079	1.049	0.039	133.02	1,762.24	64.98	60.10
Total lbs.								927.71	10,787.14	460.82	426.26
Ave. Daily								3.68	42.81	1.83	1.69

Notes: Construction would last 12 months. Site preparation (2 months), well and basin development (10 months); 1 week of paving, and there would be 4 weeks of continuous drilling for each well. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	56	10	0.0002	0.0007	1.1E-04	4.5E-05	0.20	0.58	0.09	0.04
Heavy duty truck	24	25	0.0005	0.0159	4.3E-04	2.8E-04	0.62	19.87	0.53	0.35
Total lbs/day							0.82	20.45	0.63	0.39

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Ryan Ranch-Bishop Interconnection Improvements Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Ryan Ranch-Bishop Interconnection Improvements Total Exhaust Emissions (pounds/day)	3.15	38.44	1.73	1.55

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	21	0.066	0.706	0.035	8.27	88.94	4.42	4.09
Rollers	90	1	6	21	0.047	0.417	0.031	5.95	52.56	3.87	3.58
Backhoe	150	1	8	21	0.048	0.512	0.026	8.00	86.03	4.36	4.03
Excavators	200	1	8	21	0.050	0.675	0.021	8.48	113.33	3.58	3.31
Cranes	200	1	6	21	0.090	1.017	0.046	11.32	128.18	5.82	5.38
Loader	90	1	8	21	0.038	0.345	0.027	6.35	58.01	4.47	4.13
Generator	200	1	8	21	0.079	1.049	0.039	13.30	176.22	6.50	6.01
Total								61.68	703.26	33.01	30.53
Ave. Daily								2.94	33.49	1.57	1.45

Notes: Construction would last 1 month. There would be approximately 21 workdays per month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	28	10	0.0002	0.0007	1.1E-04	4.5E-05	0.06	0.19	0.03	0.01
Heavy duty truck	12	25	0.0005	0.0159	4.3E-04	2.8E-04	0.15	4.77	0.13	0.08
Total lbs/day							0.21	4.95	0.16	0.10

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Main System-Hidden Hills Interconnection Improvements Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Main System-Hidden Hills Interconnection Improvements Total Exhaust Emissions (pounds/day)	3.15	38.44	1.73	1.55

Average Daily Offroad Equipment Construction Exhaust Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Emission Factor (pounds/hour)			Emissions (pounds)			
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5
Pavers	160	1	6	21	0.066	0.706	0.035	8.27	88.94	4.42	4.09
Rollers	90	1	6	21	0.047	0.417	0.031	5.95	52.56	3.87	3.58
Backhoe	150	1	8	21	0.048	0.512	0.026	8.00	86.03	4.36	4.03
Excavators	200	1	8	21	0.050	0.675	0.021	8.48	113.33	3.58	3.31
Cranes	200	1	6	21	0.090	1.017	0.046	11.32	128.18	5.82	5.38
Loader	90	1	8	21	0.038	0.345	0.027	6.35	58.01	4.47	4.13
Generator	200	1	8	21	0.079	1.049	0.039	13.30	176.22	6.50	6.01
Total								61.68	703.26	33.01	30.53
Ave. Daily								2.94	33.49	1.57	1.45

Notes: Construction would last approximately 1 month.

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)			
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5
Light duty truck	28	10	0.0002	0.0007	1.1E-04	4.5E-05	0.06	0.19	0.03	0.01
Heavy duty truck	12	25	0.0005	0.0159	4.3E-04	2.8E-04	0.15	4.77	0.13	0.08
Total lbs/day							0.21	4.95	0.16	0.10

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Valley Greens Pump Station Construction Exhaust Emissions

Total Daily Construction Exhaust Emissions

Project Component	ROG	NOx	PM10	PM2.5
Valley Greens Pump Station Total Exhaust Emissions (pounds/day)	1.51	20.45	0.84	0.72

Average Daily Offroad Equipment Construction Exhaust Emissions

Off Road Equipment	Approx. HP	Number	Hour/Day	Days	Emission Factor (pounds/hour)			Emissions (pounds)				
					ROG	NOX	PM	ROG	NOX	PM10	PM2.5	
Pavers	160	1	8	1	0.066	0.706	0.035	0.53	5.65	0.28	0.26	
Rollers	90	1	8	11	0.047	0.417	0.031	4.16	36.71	2.70	2.50	
Loader	90	1	8	10	0.038	0.345	0.027	3.02	27.62	2.13	1.97	
Backhoe	150	1	8	10	0.048	0.512	0.026	3.81	40.97	2.08	1.92	
Cranes	200	1	8	21	0.090	1.017	0.046	15.10	170.90	7.75	7.17	
Graders	200	1	8	2	0.077	1.043	0.034	1.23	16.68	0.54	0.50	
Generator	200	1	8	42	0.079	1.049	0.039	26.60	352.45	13.00	12.02	
								Total lbs.	54.45	650.98	28.48	26.34
								Ave. Daily	1.30	15.50	0.68	0.63

Notes: Construction would last 2 months.

Emission factors are based on CARB's Off-road emissions inventory database (see Off-road Output). A factor of 1.26639 was applied to THC to obtain ROG based on CARB (2000). A California Air Resources Board (CARB), 2000. Public Meeting to Consider Approval of Revisions to the State's On-road Motor Vehicle Emissions Inventory, Technical Support Document,

On-road Daily Construction Emissions

Vehicle Type	Trips/day	miles/trip	Emission Factors (pounds/mile)				Emissions (pounds)				
			ROG	NOx	PM10	PM2.5	ROG	NOx	PM10	PM2.5	
Light duty truck	28	10	0.0002	0.0007	1.1E-04	4.5E-05	0.06	0.19	0.03	0.01	
Heavy duty truck	12	25	0.0005	0.0159	4.3E-04	2.8E-04	0.15	4.77	0.13	0.08	
							Total lbs/day	0.21	4.95	0.16	0.10

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Offroad Output, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 25 miles one-way.

Other Non-Typical Construction Equipment

Off Road Equipment	MaxHP	Number	Hour/Day	Emission Factor (pounds/hour)			Emissions (pounds/day)				
				ROG	NOX	PM	ROG	NOX	PM10	PM2.5	
Slant Drill Rigs	350	2	24	0.069	0.971	0.030	3.32	46.60	1.44	1.33	
Jack and Bore Rigs	218	2	8	0.069	0.971	0.030	1.11	15.53	0.48	0.44	
							Total	4.43	62.13	1.92	1.77

Maximum Day Total Unmitigated Construction Emissions (Without Monterey and Transfer Pipelines)

Emissions Source	ROG	NOx	PM10	PM2.5
Equipment and Vehicle Exhaust	24.83	355.53	13.99	11.90
Fugitive Dust	--	--	216.18	30.38
Total	24.83	355.53	230.17	42.28

For fugitive dust emission calculations, refer to 3, Fugitive Dust.

Maximum Day Total Mitigated Construction Emissions (Without Monterey and Transfer Pipelines)

Emissions Source	ROG	NOx	PM10	PM2.5
Equipment and Vehicle Exhaust	24.83	355.53	13.99	11.90
Fugitive Dust	--	--	46.27	9.39
Total	24.83	355.53	60.26	21.29

For fugitive dust emission calculations, refer to 3, Fugitive Dust.

3. CONSTRUCTION FUGITIVE DUST

Grading and Earth Moving Fugitive Dust

Fugitive dust from Desalination Plant, Terminal Reservoir, and ASR Facilities Soil Disturbance

Area Disturbed (acres)	Emission Factor (pounds/acre) ¹	Emissions ² (pounds/day)	
	PM10	PM10	PM2.5 ³
4	20	80.0	16.6
	Mitigated =	28.0	7.5

site preparation and grading for the desalination plant (2 acres), ASR facilities (1 acre), and Terminal Reservoir (1 acre) sites.

Fugitive dust from Pipeline Construction Earth Moving Activities

Soil Disturbed ⁴ (cubic yards/day)	Emission Factor (pounds/cubic yard) ⁵		Emissions (pounds/day)	
	PM10	PM2.5	PM10	PM2.5
2,311	0.001634267	0.000247475	3.8	0.6
	Mitigated =		1.3	0.3

Fugitive dust from Pipeline Construction Earth Moving Activities (without Monterey or Transfer Pipelines)

Soil Disturbed ^{**} (cubic yards/day)	Emission Factor (pounds/cubic yard) ⁵		Emissions (pounds/day)	
	PM10	PM2.5	PM10	PM2.5
1,420	0.001634267	0.000247475	2.3	0.4
	Mitigated =		0.8	0.2

¹ The Midwest Research Institute has derived a value of 0.11 tons/acre/month, which converts to 10 pounds per day. The California Air Resources Board review has reviewed this factor and concluded that it represents PM10 emissions with watering. Consequently, CARB concludes that 20 pounds per acre day is more appropriate for unmitigated fugitive dust conditions (CARB, 2002).

² Mitigation is assumed to reduce emissions by 65 percent, based SCAQMD, 2007

³ PM2.5 fractions for soil disturbance and earth moving were obtained from SCAQMD, 2006.

⁴ Assumes 1,156 cubic yards of soil x 2 = daily trench dimensions (6 feet * 8 feet * 650 feet) = 31,200 ft³ = 1,156 cubic yards x 2 = 2,311. Note that the Transfer Pipeline is not included in the maximum day assumptions for the MPWSP.

⁵ Based on *truck loading* emission factors included in CalEEMod. Mean wind speed is 7.1 mph. Material moisture content is 2.5% based on AP42. See CalEEMod users manual Appendix A page 10 (<http://www.aqmd.gov/caleemod/doc/AppendixA.pdf>).

^{**} Assumes 710 cubic yards of soil x 2 = daily trench dimensions (6 feet * 8 feet * 400 feet) = 19,200 ft³ = 710 cubic yards x 2 = 1,420.

Based on AP-42 Emission Factor: $EF \text{ (lbs/ton)} = k (0.0032)(U/5)^{1.3} / (M/2)^{1.4}$

Where:

EF = emission rate in pounds PM10 per ton material handled.

k = particle size multiplier (assumed 0.35 for PM10 and 0.053 for PM2.5 per CalEEMod Users Guide, Appendix A)

U = mean wind speed

M = material moisture content (%).

Particulate Matter size	pounds PM per ton material	tons material per cubic yard	pounds PM per cubic yard
PM10	0.001292763	1.2641662	0.001634267
PM2.5	0.000195761	1.2641662	0.000247475

Unpaved Fugitive Dust From Truck Travel

9. MGD Project - Unpaved Road Fugitive Dust from Trucks

Source	VMT ¹ (miles/day)	Emission Factors (pounds/VMT) ²		Emissions (pounds/day)	
		PM10	PM2.5	PM10	PM2.5
Dirt road to Slant Well sites	37.1	1.9	0.2	69.8	7.0
Dirt Road to Terminal Reservoir	34.5	1.9	0.2	64.0	6.4
Total	71.6			Unmitigated = 133.9	13.4
				Mitigated ³ = 17.5	1.7

¹ Assumes that there would be 138 daily trips along a 0.25 mile unpaved road to the terminal reservoir site, resulting in 34.5 VMT on unpaved roads. Also assumes 106 trips per day along a 0.35 dirt road to the subsurface slant well sites, resulting in an additional 37.1 VMT per day on unpaved roads.

² Based on AP-42 Emission Factor: $E \text{ (lbs/VMT)} = k (s/12)^a (W/3)^b$

Where:

E = emission rate in pounds per vehicle mile traveled

k = particle size multiplier (assumed 1.5 lb/VMT for PM10 and 0.15 lb/VMT for PM2.5 per AP-42, Table 13.2.2-2)

a = 0.9

b = 0.45

s = silt content (assumed 8.5% for a construction site per AP-42, Table 13.2.2-1)

W = average weight (tons) of vehicles assumed to be 9.9 tons for the road to the slant wells (62% trucks weigh 2 tons, 38% weigh 23 tons) and assumed to be 9.6 tons for the road to Terminal Reservoir (64% trucks weigh 2 tons, and 36% weigh 23 tons).

³ Mitigated emissions assume that the unpaved road to the terminal reservoir site would be paved, thereby eliminating fugitive emissions from the 34.5 VMT. For the dirt road to the slant well sites, it was assumed that watering twice daily and limiting speeds to 15 mph, emissions could be reduced by 75%, based URBEMIS 2007.

Total Fugitive Dust

Applies to both 9.5 MGD and 6.1 MGD Projects

Total	Emissions (pounds/day)	
	PM10	PM2.5
Unmitigated =	217.64	30.60
Mitigated =	46.78	9.49

Applies to both 9.5 MGD and 6.1 MGD Projects (without Monterey or Transfer Pipelines)

Total	Emissions (pounds/day)	
	PM10	PM2.5
Unmitigated =	216.18	30.38
Mitigated =	46.27	9.39

4. GHG CONSTRUCTION EMISSIONS

Total Construction GHG Emissions Summary

Project Component	GHG Emissions (metric tons)			
	CO ₂	N ₂ O	CH ₄	CO ₂ e
Desal Plant Total Exhaust Emissions	7,354.05	0.11	0.21	7,391.41
Slant Wells, Pump-to-Waste PL, Electrical Conduit, and Electrical Control Building Total Exhaust Emissions - 9.5 MGD Project	2,164.34	0.03	0.07	2,176.17
Slant Wells, Pump-to-Waste PL, Electrical Conduit, and Electrical Control Building Total Exhaust Emissions - 6.1 MGD Project	1,683.37	0.03	0.05	1,692.58
Source Water Pipeline Total Exhaust Emissions (metric tons)	551.67	0.01	0.02	554.87
Salinas Valley Return and Brine Discharge Pipelines Total Exhaust Emissions	286.68	0.01	0.01	288.81
Desal Water Pipeline Total Exhaust Emissions	544.43	0.01	0.02	547.57
Transmission Main Total Exhaust Emissions	5,145.02	0.06	0.10	5,164.59
Monterey Pipeline Total Exhaust Emissions	1,117.82	0.02	0.04	1,124.35
Transfer Pipeline Total Exhaust Emissions	551.67	0.01	0.02	554.87
ASR Conveyance Pipelines Total Exhaust Emissions	372.86	0.01	0.01	375.34
Terminal Reservoir and ASR Pump Station	2,161.39	0.03	0.05	2,171.40
ASR Injection/Extraction Wells and ASR Settling Basin	1,082.39	0.02	0.04	1,089.31
Ryan Ranch-Bishop Interconnection Improvements Total Exhaust Emissions	62.04	0.00	0.00	62.45
Main System-Hidden Hills Interconnection Improvements Total Exhaust Emissions	62.04	0.00	0.00	62.45
Valley Greens Pump Station Total Exhaust Emissions	73.21	0.00	0.00	73.63
Total Emissions (metric tons) - 9.5 MGD Project	21,529.61	0.31	0.60	21,637.21
Amortized Emissions (metric tons) - 9.5 MGD Project	538.24	0.01	0.02	540.93
Total Emissions (metric tons) - 6.1 MGD Project	21,048.64	0.30	0.59	21,153.62
Amortized Emissions (metric tons) - 6.1 MGD Project	526.22	0.01	0.01	528.84

GHG Emissions Factors for Diesel Exhaust

Fuel	CO ₂ (g/gal)	N ₂ O (g/gal)	CH ₄ (g/gal)
Diesel Fuel	10,210.00	0.26	0.58

Notes: Emission factors obtained from TCR, 2014, Tables 13.1 and 13.7.

Desalination Plant Construction GHG Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Desal Plant Total Exhaust Emissions (metric tons)	7,354.05	0.11	0.21	7,391.41

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Paver	160	1	12	21	3.40	856.0	8.74	0.00	0.00	8.82
Rollers	90	2	12	63	1.69	2,556.6	26.10	0.00	0.00	26.34
Excavator	200	2	12	42	4.31	4,349.1	44.40	0.00	0.00	44.80
Loader	90	2	12	42	1.59	1,602.6	16.36	0.00	0.00	16.51
Backhoe	150	2	12	462	2.72	30,177.5	308.11	0.01	0.02	310.89
Cranes	200	2	12	462	3.24	35,890.3	366.44	0.01	0.02	369.74
Graders	200	1	12	42	4.36	2,198.9	22.45	0.00	0.00	22.65
Off-Highway Trucks	350	1	12	42	7.40	3,731.1	38.09	0.00	0.00	38.44
Off-Highway Tractor	200	1	12	42	4.79	2,415.6	24.66	0.00	0.00	24.89
Forklifts	150	4	12	462	2.69	59,630.4	608.83	0.02	0.03	614.31
Water Truck	350	1	4	420	7.40	12,437.1	126.98	0.00	0.01	128.13
Generator	200	2	12	525	4.69	59,081.6	603.22	0.02	0.03	608.66
					Total	214,927.1	2,194.4	0.1	0.1	2,214.2

Notes: Construction would occur over 25 months with three main activities: site preparation (2 months); plant development and construction (22 months); site paving (1 month). There would be approximately 21 workdays per month. Construction activities would occur around the clock, with average equipment usage at 12 hours per day.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions			
			(pound/mile)			(Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
Light duty truck	10	81,480	0.69	0.00	0.00	256.2	0.0	0.1	264.32
Heavy duty truck	63	46,200	3.71	0.00	0.00	4,903.4	0.0	0.0	4,912.91
					Total	5,159.65	0.05	0.08	5,177.23

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Slant Wells, Pump-to-Waste PL, Electrical Conduit, and Electrical Control Building Construction Emissions - 9.5 MGD Project

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Slant Wells, Pump-to-Waste PL, Electrical Conduit, and Electrical Control Building Total Exhaust Emissions (metric tons)	2,164.34	0.03	0.07	2,176.17

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Bore/Drill Rigs	350	1	24	90	8.86	19,143.3	195.45	0.00	0.01	197.21
Crane	200	2	12	378	3.24	29,364.8	299.81	0.01	0.02	302.52
Trencher	150	1	12	378	3.70	16,798.7	171.51	0.00	0.01	173.06
Generator	200	2	12	90	4.69	10,128.3	103.41	0.00	0.01	104.34
Excavators	200	1	12	90	4.31	4,659.8	47.58	0.00	0.00	48.01
Total						80,094.9	817.77	0.02	0.05	825.14

Notes: Construction would last 18 months and would occur in three phases: drilling (10 days for each of the nine wells); well development (10 days each well); electrical and pump-to-waste pipeline (1 month). There would be approximately 21 workdays per month. Drilling-related activities would occur around the clock, with drill usage at 24 hours per day and the usage for other equipment at 12 hours per day.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions			
			(pound/mile)			(Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
Light duty truck	10	19,958	0.69	0.00	0.00	62.8	0.0	0.0	64.75
Heavy duty truck	63	12,096	3.71	0.00	0.00	1,283.8	0.0	0.0	1,286.29
Total						1,346.57	0.01	0.02	1,351.03

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Slant Wells, Pump-to-Waste PL, Electrical Conduit, and Electrical Control Building Construction Emissions - 6.1 MGD Project

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Slant Wells, Pump-to-Waste PL, Electrical Conduit, and Electrical Control Building Total Exhaust Emissions (metric tons)	1,683.37	0.03	0.05	1,692.58

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Bore/Drill Rigs	350	1	24	70	8.86	14,889.3	152.02	0.00	0.01	153.39
Crane	200	2	12	294	3.24	22,839.3	233.19	0.01	0.01	235.29
Trencher	150	1	12	294	3.70	13,065.6	133.40	0.00	0.01	134.60
Generator	200	2	12	70	4.69	7,877.5	80.43	0.00	0.00	81.15
Excavators	200	1	12	70	4.31	3,624.3	37.00	0.00	0.00	37.34
Total						62,296.0	636.04	0.02	0.04	641.77

Notes: Construction would last approximately 14 months and would occur in three phases: drilling (10 days for each of the seven wells); well development (10 days each well); electrical and pump-to-waste pipeline (1 month). There would be approximately 21 workdays per month. Drilling-related activities would occur around the clock, with drill usage at 24 hours per day and the usage for other equipment at 12 hours per day.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions			
			(pound/mile)			(Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
Light duty truck	10	15,523	0.69	0.00	0.00	48.8	0.0	0.0	50.36
Heavy duty truck	63	9,408	3.71	0.00	0.00	998.5	0.0	0.0	1,000.45
Total						1,047.33	0.01	0.02	1,050.80

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Source Water Pipeline Construction Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Source Water Pipeline Total Exhaust Emissions (metric tons)	551.67	0.01	0.02	554.87

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	126	3.40	2,568.1	26.22	0.00	0.00	26.46
Rollers	90	1	6	126	1.69	1,278.3	13.05	0.00	0.00	13.17
Backhoe	150	1	8	126	2.72	2,743.4	28.01	0.00	0.00	28.26
Excavators	200	1	8	126	4.31	4,349.1	44.40	0.00	0.00	44.80
Cranes	200	1	6	126	3.24	2,447.1	24.98	0.00	0.00	25.21
Jack-and-Bore Rig	350	1	8	10	8.86	709.0	7.24	0.00	0.00	7.30
Loader	90	1	8	126	1.59	1,602.6	16.36	0.00	0.00	16.51
Generator	200	1	8	126	4.69	4,726.5	48.26	0.00	0.00	48.69
					Total	20,424.2	208.53	0.01	0.01	210.41

Notes: Construction would last 6 months. There would be 10 days of jack-and-boring at the Highway 1 crossing. There would be approximately 21 workdays per month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions				
			(pound/mile)			(Metric tons)				
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e	
Light duty truck	10	7,056	0.69	0.00	0.00	22.2	0.0	0.0	22.89	
Heavy duty truck	63	3,024	3.71	0.00	0.00	321.0	0.0	0.0	321.57	
						Total	343.14	0.00	0.01	344.46

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Salinas Valley Return and Brine Discharge Pipelines Construction Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Salinas Valley Return and Brine Discharge Pipelines Total Exhaust Emissions (metric tons)	286.68	0.01	0.01	288.81

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	126	3.40	2,568.1	26.22	0.00	0.00	26.46
Rollers	90	1	6	126	1.69	1,278.3	13.05	0.00	0.00	13.17
Backhoe	150	1	8	126	2.72	2,743.4	28.01	0.00	0.00	28.26
Excavators	200	1	8	126	4.31	4,349.1	44.40	0.00	0.00	44.80
Cranes	200	1	6	126	3.24	2,447.1	24.98	0.00	0.00	25.21
Loader	90	1	8	126	1.59	1,602.6	16.36	0.00	0.00	16.51
Generator	200	1	8	126	4.69	4,726.5	48.26	0.00	0.00	48.69
					Total	19,715.2	201.29	0.01	0.01	203.11

Notes: Construction would last 6 months. There would be approximately 21 workdays per month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions				
			(pound/mile)			(Metric tons)				
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e	
Light duty truck	10	1,638	0.69	0.00	0.00	5.2	0.0	0.0	5.31	
Heavy duty truck	63	756	3.71	0.00	0.00	80.2	0.0	0.0	80.39	
						Total	85.39	0.00	0.00	85.71

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Desalinated Water Pipeline Construction Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Desal Water Pipeline Total Exhaust Emissions (metric tons)	544.43	0.01	0.02	547.57

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	126	3.40	2,568.1	26.22	0.00	0.00	26.46
Rollers	90	1	6	126	1.69	1,278.3	13.05	0.00	0.00	13.17
Backhoe	150	1	8	126	2.72	2,743.4	28.01	0.00	0.00	28.26
Excavators	200	1	8	126	4.31	4,349.1	44.40	0.00	0.00	44.80
Cranes	200	1	6	126	3.24	2,447.1	24.98	0.00	0.00	25.21
Loader	90	1	8	126	1.59	1,602.6	16.36	0.00	0.00	16.51
Generator	200	1	8	126	4.69	4,726.5	48.26	0.00	0.00	48.69
Total						19,715.2	201.29	0.01	0.01	203.11

Notes: Construction would last 6 months. There would be approximately 21 workdays per month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors (pound/mile)			Total Emissions (Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
			Light duty truck	10	7,056	0.69	0.00	0.00	22.2
Heavy duty truck	63	3,024	3.71	0.00	0.00	321.0	0.0	0.0	321.57
Total						343.14	0.00	0.01	344.46

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Transmission Main Construction Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Transmission Main Total Exhaust Emissions (metric tons)	5,145.02	0.06	0.10	5,164.59

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	126	3.40	2,568.1	26.22	0.00	0.00	26.46
Rollers	90	1	6	126	1.69	1,278.3	13.05	0.00	0.00	13.17
Backhoe	150	1	8	126	2.72	2,743.4	28.01	0.00	0.00	28.26
Excavators	200	1	8	126	4.31	4,349.1	44.40	0.00	0.00	44.80
Cranes	200	1	6	126	3.24	2,447.1	24.98	0.00	0.00	25.21
Jack-and-Bore Rig	350	1	8	25	8.86	1,772.5	18.10	0.00	0.00	18.26
Loader	90	1	8	126	1.59	1,602.6	16.36	0.00	0.00	16.51
Generator	200	1	8	126	4.69	4,726.5	48.26	0.00	0.00	48.69
Total						21,487.7	219.39	0.01	0.01	221.37

Notes: Construction would last 6 months. There would be 25 days of jack-and-boring at the two Highway 1 crossings and the crossing of Reservation Road. There would be approximately 21 workdays per month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors (pound/mile)			Total Emissions (Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
			Light duty truck	10	7,056	0.69	0.00	0.00	22.2
Heavy duty truck	63	3,024	3.71	0.00	0.00	4,903.4	0.0	0.0	4,912.91
Total						4,925.63	0.05	0.08	4,943.22

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Monterey Pipeline Construction Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Monterey Pipeline Total Exhaust Emissions (metric tons)	1,117.82	0.02	0.04	1,124.35

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	252	3.40	5,136.2	52.44	0.00	0.00	52.91
Rollers	90	1	6	252	1.69	2,556.6	26.10	0.00	0.00	26.34
Backhoe	150	1	8	252	2.72	5,486.8	56.02	0.00	0.00	56.53
Excavators	200	1	8	252	4.31	8,698.3	88.81	0.00	0.01	89.61
Cranes	200	1	6	252	3.24	4,894.1	49.97	0.00	0.00	50.42
Jack-and-Bore Rig	350	1	8	40	8.86	2,836.0	28.96	0.00	0.00	29.22
Loader	90	1	8	252	1.59	3,205.3	32.73	0.00	0.00	33.02
Generator	200	1	8	252	4.69	9,453.1	96.52	0.00	0.01	97.39
					Total	42,266.4	431.54	0.01	0.02	435.43

Notes: Construction would last 12 months. There would be 40 days of jack-and-boring at the Highway 1, Highway 218, and other crossings. There would be approximately 21 workdays per month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions			
			(pound/mile)			(Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
Light duty truck	10	14,112	0.69	0.00	0.00	44.4	0.0	0.0	45.78
Heavy duty truck	63	6,048	3.71	0.00	0.00	641.9	0.0	0.0	643.14
					Total	686.28	0.01	0.01	688.92

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Transfer Pipeline Construction Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Transfer Pipeline Total Exhaust Emissions (metric tons)	551.67	0.01	0.02	554.87

Total Offroad Equipment Emissions

Off-Road Equipment	Offroad AveHP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	126	3.40	2,568.1	26.22	0.00	0.00	26.46
Rollers	90	1	6	126	1.69	1,278.3	13.05	0.00	0.00	13.17
Backhoe	150	1	8	126	2.72	2,743.4	28.01	0.00	0.00	28.26
Excavators	200	1	8	126	4.31	4,349.1	44.40	0.00	0.00	44.80
Cranes	200	1	6	126	3.24	2,447.1	24.98	0.00	0.00	25.21
Jack-and-Bore Rig	350	1	8	10	8.86	709.0	7.24	0.00	0.00	7.30
Loader	90	1	8	126	1.59	1,602.6	16.36	0.00	0.00	16.51
Generator	200	1	8	126	4.69	4,726.5	48.26	0.00	0.00	48.69
					Total	20,424.2	208.53	0.01	0.01	210.41

last 6 months. There would be 10 days of jack-and-

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions			
			(pound/mile)			(Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
Light duty truck	10	7,056	0.69	0.00	0.00	22.2	0.0	0.0	22.89
Heavy duty truck	63	3,024	3.71	0.00	0.00	321.0	0.0	0.0	321.57
					Total	343.14	0.00	0.01	344.46

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

ASR Conveyance and Pump to Waste Pipelines Construction Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
ASR Conveyance Pipelines Total Exhaust Emissions (metric tons)	372.86	0.01	0.01	375.34

Total Offroad Equipment Emissions

Off Road Equipment	Approx. HP	Number	Hour/Day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	126	3.40	2,568.1	26.22	0.00	0.00	26.46
Rollers	90	1	6	126	1.69	1,278.3	13.05	0.00	0.00	13.17
Backhoe	150	1	8	126	2.72	2,743.4	28.01	0.00	0.00	28.26
Excavators	200	1	8	126	4.31	4,349.1	44.40	0.00	0.00	44.80
Cranes	200	1	6	126	3.24	2,447.1	24.98	0.00	0.00	25.21
Jack-and-Bore Rig	350	0	0	0	8.86	0.0	0.00	0.00	0.00	0.00
Loader	90	1	8	126	1.59	1,602.6	16.36	0.00	0.00	16.51
Generator	200	1	8	126	4.69	4,726.5	48.26	0.00	0.00	48.69
					Total	19,715.2	201.3	0.0	0.0	203.1

Notes: Construction would last 6 months. There would be approximately 21 workdays per month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors (pound/mile)			Total Emissions (Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
			Light duty truck	10	3,528	0.69	0.00	0.00	11.1
Heavy duty truck	63	1,512	3.71	0.00	0.00	160.5	0.0	0.0	160.79
					Total	171.57	0.00	0.00	172.23

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Terminal Reservoir and ASR Pump Station

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Terminal Reservoir and ASR Pump Station (metric tons)	2,161.39	0.03	0.05	2,171.40

Total Offroad Equipment Emissions

Off Road Equipment	Approx. HP	Number	Hour/Day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	8	21	3.40	570.7	5.83	0.00	0.00	5.88
Rollers	90	1	8	63	1.69	852.2	8.70	0.00	0.00	8.78
Excavator	200	1	8	42	4.31	1,449.7	14.80	0.00	0.00	14.93
Loader	90	1	8	42	1.59	534.2	5.45	0.00	0.00	5.50
Backhoe	150	1	8	315	2.72	6,858.5	70.03	0.00	0.00	70.66
Cranes	200	2	8	315	3.24	16,313.8	166.56	0.00	0.01	168.06
Graders	200	1	8	42	4.36	1,465.9	14.97	0.00	0.00	15.10
Off-Highway Trucks	350	1	8	42	7.40	2,487.4	25.40	0.00	0.00	25.63
Off-Highway Tractor	200	1	8	42	4.79	1,610.4	16.44	0.00	0.00	16.59
Generator	200	1	8	378	4.69	14,179.6	144.77	0.00	0.01	146.08
					Total	46,322.5	473.0	0.0	0.0	477.2

last 18 months and occur
with three main activities: site

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors (pound/mile)			Total Emissions (Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
			Light duty truck	10	26,611	0.69	0.00	0.00	83.7
Heavy duty truck	63	15,120	3.71	0.00	0.00	1,604.8	0.0	0.0	1,607.86
					Total	1,688.44	0.02	0.03	1,694.19

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

**ASR
Injection/Extraction
Wells and ASR
Settling Basin
Construction
Emissions**

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
ASR Injection/Extraction Wells and ASR Settling Basin (metric tons)	1,082.39	0.02	0.04	1,089.31

Total Offroad Equipment Emissions

Off Road Equipment	Approx. HP	Number	Hour/Day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	8	5	3.40	135.9	1.39	0.00	0.00	1.40
Rollers	90	1	8	47	1.69	635.8	6.49	0.00	0.00	6.55
Excavator	200	1	8	42	4.31	1,449.7	14.80	0.00	0.00	14.93
Loader	90	1	8	210	1.59	2,671.1	27.27	0.00	0.00	27.52
Backhoe	150	1	8	210	2.72	4,572.4	46.68	0.00	0.00	47.10
Drill Rig	350	1	24	40	8.86	8,508.1	86.87	0.00	0.00	87.65
Cranes	200	2	8	210	3.24	10,875.9	111.04	0.00	0.01	112.04
Graders	200	1	8	42	4.36	1,465.9	14.97	0.00	0.00	15.10
Off-Highway Trucks	350	1	8	210	7.40	12,437.1	126.98	0.00	0.01	128.13
Off-Highway Tractor	200	1	8	42	4.79	1,610.4	16.44	0.00	0.00	16.59
Generator	200	1	8	210	4.69	7,877.5	80.43	0.00	0.00	81.15
Total						52,239.8	533.4	0.0	0.0	538.2

Notes: Construction would last 12 months. Site preparation (2 months), well and basin development (10 months); 1 week of paving, and there would be 4 weeks of continuous dri well. There would be approximately 21 workdays per month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors (pound/mile)			Total Emissions (Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
Light duty truck	10	11,290	0.69	0.00	0.00	35.5	0.0	0.0	36.62
Heavy duty truck	63	4,838	3.71	0.00	0.00	513.5	0.0	0.0	514.52
Total						549.02	0.01	0.01	551.14

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Ryan Ranch-Bishop Interconnection Improvements Construction Exhaust Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Ryan Ranch-Bishop Interconnection Improvements Total Exhaust Emissions (metric tons)	62.04	0.00	0.00	62.45

Total Offroad Equipment Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	21	3.40	428.0	4.37	0.00	0.00	4.41
Rollers	90	1	6	21	1.69	213.0	2.18	0.00	0.00	2.19
Backhoe	150	1	8	21	2.72	457.2	4.67	0.00	0.00	4.71
Excavators	200	1	8	21	4.31	724.9	7.40	0.00	0.00	7.47
Cranes	200	1	6	21	3.24	407.8	4.16	0.00	0.00	4.20
Loader	90	1	8	21	1.59	267.1	2.73	0.00	0.00	2.75
Generator	200	1	8	21	4.69	787.8	8.04	0.00	0.00	8.12
Total						3,285.9	33.5	0.0	0.0	33.9

Notes: Construction would last 1 month. There would be approximately 21 workdays per month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors (pound/mile)			Total Emissions (Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e

Light duty truck	10	554	0.69	0.00	0.00	1.7	0.0	0.0	1.80
Heavy duty truck	63	252	3.71	0.00	0.00	26.7	0.0	0.0	26.80
					Total	28.49	0.00	0.00	28.60

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Main System-Hidden Hills Interconnection Improvements Construction Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Main System-Hidden Hills Interconnection Improvements Total Exhaust Emissions (metric tons)	62.04	0.00	0.00	62.45

Total Offroad Equipment Emissions

Off-Road Equipment	Approx. HP	Number	Hour/day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	6	21	3.40	428.0	4.37	0.00	0.00	4.41
Rollers	90	1	6	21	1.69	213.0	2.18	0.00	0.00	2.19
Backhoe	150	1	8	21	2.72	457.2	4.67	0.00	0.00	4.71
Excavators	200	1	8	21	4.31	724.9	7.40	0.00	0.00	7.47
Cranes	200	1	6	21	3.24	407.8	4.16	0.00	0.00	4.20
Loader	90	1	8	21	1.59	267.1	2.73	0.00	0.00	2.75
Generator	200	1	8	21	4.69	787.8	8.04	0.00	0.00	8.12
					Total	3,285.9	33.5	0.0	0.0	33.9

Notes: Construction would last approximately 1 month.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions			
			(pound/mile)			(Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
Light duty truck	10	554	0.69	0.00	0.00	1.7	0.0	0.0	1.80
Heavy duty truck	63	252	3.71	0.00	0.00	26.7	0.0	0.0	26.80
					Total	28.49	0.00	0.00	28.60

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Valley Greens Pump Station Construction Exhaust Emissions

Total Construction Emissions (metric tons)

Project Component	CO ₂	N ₂ O	CH ₄	CO ₂ e
Valley Greens Pump Station Total Exhaust Emissions (metric tons)	73.21	0.00	0.00	73.63

Total Offroad Equipment Emissions

Off Road Equipment	Approx. HP	Number	Hour/Day	Days	Diesel Fuel Consumption		Total Emissions (metric tons)			
					gallons/ hour	gallons	CO ₂	N ₂ O	CH ₄	CO ₂ e
Pavers	160	1	8	1	3.40	27.2	0.28	0.00	0.00	0.28
Rollers	90	1	8	11	1.69	148.8	1.52	0.00	0.00	1.53
Loader	90	1	8	10	1.59	127.2	1.30	0.00	0.00	1.31
Backhoe	150	1	8	10	2.72	217.7	2.22	0.00	0.00	2.24
Cranes	200	1	8	21	3.24	543.8	5.55	0.00	0.00	5.60
Graders	200	1	8	2	4.36	69.8	0.71	0.00	0.00	0.72
Generator	200	1	8	42	4.69	1,575.5	16.09	0.00	0.00	16.23
Total						2,710.0	27.7	0.0	0.0	27.9

Notes: Construction would last 2 months.

Emission factors are based on CARB's Off-road emissions inventory database (see Off-road Output). A factor of 1.26639 was applied to THC to obtain ROG based on CARB (2000). A factor of 0.92 was applied to PM10 to obtain PM2.5 based on SCAQMD (2006).

California Air Resources Board (CARB), 2000. Public Meeting to Consider Approval of Revisions to the State's On-road Motor Vehicle Emissions Inventory, Technical Support Document, Section 4.13, Factors for Converting THC Emissions Rates TOG/ROG, May 2000.

Total On-road Construction GHG Emissions

On-road Sources	Miles/trip	Trips	Emission Factors			Total Emissions			
			(pound/mile)			(Metric tons)			
			CO ₂	CH ₄	N ₂ O	CO ₂	N ₂ O	CH ₄	CO ₂ e
Light duty truck	10	874	0.69	0.00	0.00	2.7	0.0	0.0	2.83
Heavy duty truck	63	403	3.71	0.00	0.00	42.8	0.0	0.0	42.88
Total						45.54	0.00	0.00	45.71

Notes:

Notes: For trip amounts, see Construction Worker Auto and Truck Trips, below; for emission factors, refer to Emfac 2011 On-road Emission Factors, below. It is assumed that workers would commute 10 miles to the construction site and truck trips would average 63 miles one-way.

Off-road fuel use factors were derived using OFFROAD2011

CO₂ on-road emission factors were derived using EMFAC2011; CH₄ and N₂O emission factors are from TCR, 2013, Table 13.4.

The assumed length for heavy duty trips (63 miles) represents the distance from Marina to San Jose; and from Marina to Salinas (10 miles) for light duty trucks.

Trips are based on maximum daily trip rates for one year, five days a week. The total construction period would be two years.

*Global Warming Potential for CH₄ = 25; GWP for N₂O = 298.

Source: CARB, 2014.

5. CONSTRUCTION WORKER AUTO AND TRUCK TRIPS

	Const. workdays	Construction		Vehicle Trips for Criteria Pollutants (per day)				Vehicle Trips Total for GHG			
				Worker		Truck		Worker		Truck	
		Workers	Trucks	Roundtrip	One-Way	Roundtrip	One-Way	Roundtrip	One-Way	Roundtrip	One-Way
9.6 MGD Facility											
Subsurface Slant Wells	378	30	20	33	66	20	40	9,979	19,958	6,048	12,096
Desalination Plant	525	88	55	97	194	55	110	40,740	81,480	23,100	46,200
Source Water Pipeline	126	25	12	28	56	12	24	3,528	7,056	1,512	3,024
Brine Discharge Pipeline	42	12	6	13	28	6	12	546	1,092	252	504
Salinas Valley Return Pipeline	63	12	6	13	28	6	12	819	1,638	378	756
Desalinated Water Pipeline	126	25	12	28	56	12	24	3,528	7,056	1,512	3,024
Transmission Main Pipeline	126	25	12	28	56	12	24	3,528	7,056	1,512	3,024
Transfer Pipeline	126	25	12	28	56	12	24	3,528	7,056	1,512	3,024
Terminal Reservoir/ASR Pump Station	378	40	25	44	88	25	50	13,306	26,611	7,560	15,120
ASR Conveyance Pipeline	63	25	12	28	56	12	24	1,764	3,528	756	1,512
ASR Injection/Extraction Wells	252	25	12	28	56	12	24	5,645	11,290	2,419	4,838
Monterey Pipeline	252	25	12	28	56	12	24	7,056	14,112	3,024	6,048
Valley Greens Pump Station	42	12	6	13	28	6	12	437	874	202	403
Ryan Ranch-Bishop Interconnection	21	12	6	13	28	6	12	277	554	126	252
Main System to Hidden Hills	21	12	6	13	28	6	12	277	554	126	252

	Const. workdays	Construction		Vehicle Trips for Criteria Pollutants (per day)				Vehicle Trips Total for GHG			
				Worker		Truck		Worker		Truck	
		Workers	Trucks	Roundtrip	One-Way	Roundtrip	One-Way	Roundtrip	One-Way	Roundtrip	One-Way
6.4 MGD Facility											
Subsurface Slant Wells	294	30	20	33	66	20	40	7,762	15,523	4,704	9,408
<i>Difference Compared to 9.6 MGD Facility</i>				0	0	0	0	-2,218	-4,435	-1,344	-2,688

7. ON-ROAD OPERATIONAL CRITERIA POLLUTANT EMISSIONS

Emission Factors

Vehicle Type	Running Exhaust Emission Factors				
	(pounds/mile)				
	ROG	NOx	PM10	PM2.5	CO
Light duty truck	0.0001	0.0004	1.0E-04	4.4E-05	0.0043
Heavy duty truck	0.0002	0.0098	2.8E-04	1.4E-04	0.0010

Note: derived from EMFAC 2014.

PM10 and PM2.5 emission factors include break and tire wear factors in addition to exhaust.

Daily Operational Emissions (pounds/day)

Proposed Project*

Vehicle Type	Trips/day	miles/trip	ROG	NOx	PM10	PM2.5	CO
Light duty truck	60	10	0.06	0.26	0.06	0.03	2.57
Heavy duty truck	6	25	0.04	1.46	0.04	0.02	0.16
Total	66		0.10	1.73	0.10	0.05	2.73

Notes: Trips are one-way; assumes 30 employees would require 2 trips per day; 3 material hauls.

Average truck trip length represents from the Santa Clara/San Benito County line (south of Gilroy) down to Seaside.

Daily trip amounts obtained from the EIR Team traffic engineer (2013).

*There would be no change in daily emissions associated with the 6.4 MGD Variant compared to the proposed 9.6 MDG Project.

8. EMERGENCY GENERATOR TESTING CRITERIA POLLUTANT EMISSIONS

Criteria Pollutant Emission Factors

Equipment	HP ^a	Load Factor ^b	Tier 2 Emission Factors (g/bhp-hr) ^c				Tier 2 Emission Rates (lb/hr)				
			HC	NOx	PM ^d	CO	ROG	NOx	PM10	PM2.5	CO
Emergency Generator - at Desal Plant	1,000	0.74	0.030	5.180	0.150	0.230	0.062	8.451	0.245	0.226	0.375
Emergency Generator - at Desal Plant (Variant)	804	0.74	0.030	5.180	0.150	0.230	0.050	6.794	0.197	0.182	0.302
Emergency Generator at ASR Pump Station	355	0.74	0.100	2.970	0.079	0.360	0.073	1.720	0.046	0.042	0.208
Emergency Generator at Valley Greens Pump Station	68	0.74		3.297	0.150	0.761	0.055	0.366	0.017	0.015	0.084

Notes:

^a Proposed generator at desal plant horsepower is from RBF, 2013, Memorandum - MPWSP Capital and O&M Cost Estimate Update, January 9, 2013, Table 2.

^b Load factors are from CalEEMod.

^c Emission factors are from Caterpillar specification sheets:

Standby 800 ekW 1,000 kVA 60 Hz 1,800 rpm 480 Volts, Tier 2.

Standby 250 ekW 313 kVA 60 Hz 1,800 rpm 480 Volts, Tier 3.

Standby 50 ekW 50 kVA 60 Hz 1,800 rpm 120 Volts, Tier 3.

^d Emission factor adjusted per MBUAPCD Rule 1010.

^e ROG emission factor based on Offroad database for "other construction equipment". Nox emission factor is conservative; includes Nox+HC

1 kw = 1.340483 hp

A factor of 1.26639 was applied to THC to obtain ROG based on CARB (2000). A factor of 0.92 was applied to PM10 to obtain PM2.5 based on SCAQMD (2006).

Emergency Generator Criteria Pollutant Emissions

Equipment	Test Duration		Maximum Day (lbs/day)					Annual Average (lbs/day)				
	hrs/test	test/yr	ROG	NOx	PM10	PM2.5	CO	ROG	NOx	PM10	PM2.5	CO
Emergency Generator - at Desal Plant	4.2	12	0.26	35.21	1.02	0.94	1.56	0.01	1.16	0.03	0.03	0.05
Emergency Generator - at Desal Plant (Variant)	4.2	12	0.21	28.31	0.82	0.76	1.26	0.01	0.93	0.03	0.02	0.04
Emergency Generator at ASR Pump Station	4.2	12	0.31	7.17	0.19	0.18	0.87	0.01	0.24	0.01	0.01	0.03
Emergency Generator at Valley Greens Pump Station	4.2	12	0.23	1.52	0.07	0.06	0.35	0.01	0.05	0.00	0.00	0.01
Total Emergency Generator Emissions for Project			0.79	43.90	1.28	1.18	2.78	0.03	1.44	0.04	0.04	0.09
Total Emergency Generator Emissions for Project Variant			0.74	37.00	1.08	1.00	2.48	0.02	1.22	0.04	0.03	0.14

It is assumed that each generator would be tested approximately 50 hours per year (4.2 hours per test, 12 tests per year).

9. GHG OPERATIONAL EMISSIONS

Baseline Indirect Emissions from Electricity Consumption

GHGs from Electricity Consumption				
GHG	Emission Factor (lb/kWh)	Electricity Consumption kWhr	metric tons	CO2e*
				(metric tons)
CO2	0.29000	7,694,135	1,012.11	1,012.11
CH4	0.000029	7,694,135	0.10	2.53
N2O	0.000006	7,694,135	0.02	6.42
			Total =	1,021.05

Indirect Emissions from Electricity Consumption

GHGs from Electricity Consumption				
GHG	Emission Factor (lb/kWh)	Electricity Consumption kWhr	metric tons	CO2e*
				(metric tons)
9.5 MGD Project				
CO2	0.29000	48,209,087	6,341.57	6,341.57
CH4	0.000029	48,209,087	0.63	15.82
N2O	0.000006	48,209,087	0.13	40.21
			Total =	6,397.60
6.1 MGD Project - CalAm Facilities Only				
CO2	0.29000	32,533,800	4,279.60	4,279.60
CH4	0.000029	32,533,800	0.43	10.68
N2O	0.000006	32,533,800	0.09	27.13
			Total =	4,317.41

Net Increase in Indirect Emissions from Electricity Consumption

GHGs from Electricity Consumption				
GHG	Emission Factor (lb/kWh)	Electricity Consumption kWhr	metric tons	CO2e*
				(metric tons)
9.5 MGD Project				
CO2	0.29000	40,514,952	5,329.46	5,329.46
CH4	0.000029	40,514,952	0.53	13.30
N2O	0.000006	40,514,952	0.11	33.79
			Total =	5,376.55
6.1 MGD Project - CalAm Facilities Only				
CO2	0.29000	24,839,665	3,267.49	3,267.49
CH4	0.000029	24,839,665	0.33	8.15
N2O	0.000006	24,839,665	0.07	20.72
			Total =	3,296.36

Notes: The emission factor for CO2 was obtained from PG&E, 2013. Emission factors for CH4 and N2O are from TCR, 2014. Project baseline and proposed electricity consumption estimates provided by CalAm March 25, 2014.

*Global Warming Potential for CH4 = 25; GWP for N2O = 298 (CARB, 2014).

California Air Resources Board (CARB), 2014. Updated Scoping Report. May 2014.

Pacific Gas and Electric Company (PG&E), 2013. Greenhouse Gas Emission Factors Info Sheet, last revised April, 2013.

The Climate Registry (TCR), 2014. 2014 Climate Registry Default Emission Factors, April 11, 2014.

RBF, 2013. Memorandum: Monterey Peninsula Water Supply Project Capital and O&M Cost Estimate Update, January 9, 2013.

Project Mobile Sources

On-road Sources	Miles/trip	One way Trips	Running Exhaust			Total Emissions			
			Emission Factor			(Metric tons)			
			(pound/mile)			CO ₂	CH ₄	N ₂ O	CO ₂ e
Light duty truck (gas)	10	21,900	0.6456	0.0000	0.0002	64.14	0.00	0.01907	69.92
Heavy duty truck	63	1,560	3.6055	0.0000	0.0000	160.73	0.00	0.00047	160.88
						224.87	0.00	0.01955	230.80

Notes: Emission factors for mobile sources were derived from EMFAC2014 (see Emfac 2014 Offroad Emission Factors). It is assumed that 30 employees would each generate two light duty truck trips per day; 7 days per week (365 days per year), and that there would be 3 heavy duty truck deliveries 260 days per year.

Emergency Generator Emissions

GHG Emissions Factors for Diesel and Gasoline Exhaust

Fuel	CO ₂ (g/gal)	N ₂ O (g/gal)	CH ₄ (g/gal)
Diesel Fuel	10,210.00	0.26	0.58

Notes: Emission factors obtained from TCR, 2013, Tables 13.1 and 13.7.

Emergency Generator Emissions

Off-Road Equipment	MaxHP ^a	Hrs/yr	Diesel Fuel Consumption ^b		Total Emissions (metric tons)			
			gal/hr	gal/yr	CO ₂	N ₂ O	CH ₄	CO ₂ e
Emergency Generator - at Desal Plant	1,005	50.00	45.40	2,270.00	23.177	0.001	0.001	23.39
Emergency Generator - at Desal Plant (Variant)	804	50.00	36.32	1,816.00	18.541	0.000	0.001	18.71
Generator at ASR Pump	335	50.00	15.50	775.00	7.913	0.000	0.000	7.98
Generator at Valley Greens Pump Station	68	50.00	3.30	165.00	1.685	0.000	0.000	1.70
Total Emergency Generator Emissions for Project				3,210.00	32.77	0.00	0.00	33.07
Total Emergency Generator Emissions for Project Variant				2,756.00	28.14	0.00	0.00	28.39

Assumed at 75 percent load with fan.

^a Proposed generator at desal plant horsepower is from RBF, 2013, Memorandum - MPWSP Capital and O&M Cost Estimate Update, January 9, 2013, Table 2.

^b Diesel fuel consumption factors are from Caterpillar specification sheets:

Standby 800 ekW 1,000 kVA 60 Hz 1,800 rpm 480 Volts, Tier 2.

Standby 250 ekW 313 kVA 60 Hz 1,800 rpm 480 Volts, Tier 3.

Standby 50 ekW 50 kVA 60 Hz 1,800 rpm 120 Volts, Tier 3.

Total Proposed Project Operation Emissions

Total Project Emissions	Total Emissions (metric tons)			
	CO ₂	N ₂ O	CH ₄	CO ₂ e
emissions from Operation - 9.5 MGD Project	5,587.10	0.13	0.54	5,640.42
emissions from Operation - 6.1 MGD Project	3,520.49	0.09	0.33	3,555.55

Total Proposed Project Operation Emissions

Proposed Project Option	Total CO ₂ e Emissions (metric tons)		
	Operation	Construction	Total
9.5 MGD Project	5,640.42	540.93	6,181.35
6.1 MGD Project	3,555.55	528.84	4,084.39

	CalAm Facilities	GWR Facilities*	Total
MPWSP Variant	4,084.39	1,844	5,928

*Obtained from: Illingworth & Rodkin, Inc., 2014a. Construction Air Quality Analysis for Pure Water Monterey Groundwater Replenishment Project. December 2014

Illingworth & Rodkin, Inc., 2014b. Operational Air Quality Analysis for Pure Water Monterey Groundwater Replenishment Project. December 2014

10. OFFROAD MODEL OUTPUT

Calendar Year	Air Basin	Equipment Type	HPBin	Scen BSFC	BSFC (gal/hr)*	Scen NOx	NOX (lbs/hr)	Scen PM	PM10 (lbs/hr)	Scen HC	HC(lbs/hr)	Activity	ScenPopulation
2016	NCC	Bore/Drill Rigs	50	4887.974474	1.167189	0.067959474	0.230516	0.004908049	0.0166479	0.009215171	0.0312575	589.629144	1.78740085
2016	NCC	Bore/Drill Rigs	120	29868.60246	2.0765109	0.352884842	0.3484906	0.020445394	0.0201908	0.023435374	0.0231436	2025.218536	5.475091025
2016	NCC	Bore/Drill Rigs	175	34876.79379	3.8970312	0.374861308	0.594986	0.016784276	0.0266403	0.024468856	0.0388374	1260.067686	4.289762041
2016	NCC	Bore/Drill Rigs	250	49407.06911	5.351539	0.434112684	0.6679299	0.01274305	0.0196066	0.023803201	0.0366238	1299.875025	4.270947295
2016	NCC	Bore/Drill Rigs	500	54989.34069	8.8626534	0.424028661	0.9707765	0.013086347	0.02996	0.023888432	0.0546905	873.5865735	2.991544581
2016	NCC	Cranes	50	1593.517076	0.6637329	0.026649786	0.1576773	0.002661442	0.0157468	0.007678286	0.0454297	338.0294833	0.827931539
2016	NCC	Cranes	120	38010.67336	1.3174452	1.102443021	0.5427776	0.081408664	0.0400808	0.109414869	0.0538694	4062.227046	9.982488839
2016	NCC	Cranes	175	100318.56	2.2137223	2.363426212	0.740837	0.128033876	0.0401334	0.184144631	0.0577218	6380.421261	14.97373326
2016	NCC	Cranes	250	169454.0082	3.2368618	3.749062828	1.0172643	0.170117608	0.0461594	0.261490356	0.0709523	7370.872494	16.81883783
2016	NCC	Cranes	500	259564.3776	5.0029637	4.404321531	1.2058688	0.181816875	0.04978	0.285435672	0.0781501	7304.810347	16.13283741
2016	NCC	Excavators	50	194509.1044	0.7855749	2.530252671	0.1451611	0.188076501	0.01079	0.353300592	0.0202689	34861.29548	51.42216325
2016	NCC	Excavators	120	252546.2199	1.5972371	3.608195802	0.3241585	0.263720475	0.0236925	0.301238332	0.0270631	22261.92344	37.19318971
2016	NCC	Excavators	175	531975.8517	2.88388	6.516188916	0.5017851	0.320628631	0.0246903	0.471805493	0.0363318	25972.03222	47.25450532
2016	NCC	Excavators	250	676286.6246	4.3146238	7.443586305	0.6745795	0.235022331	0.021299	0.439811441	0.0398582	22068.81763	40.62414043
2016	NCC	Excavators	500	1121639.074	6.4615065	9.516803585	0.7787724	0.306394646	0.0250727	0.595847792	0.048759	24440.5261	41.31875008
2016	NCC	Graders	50	1284.356541	0.8631312	0.024098804	0.2300517	0.003194897	0.0304991	0.00942271	0.089951	209.5077068	0.655836628
2016	NCC	Graders	120	34554.38117	1.9103773	0.982937596	0.7719351	0.081423145	0.0639444	0.102927766	0.0808328	2546.68462	6.981486681
2016	NCC	Graders	175	321524.1118	3.1860335	7.812773852	1.0997167	0.438909854	0.0617804	0.633706991	0.0891998	14208.70244	32.66489526
2016	NCC	Graders	250	559365.9607	4.36293	9.410880265	1.0426805	0.305730088	0.0338734	0.547030504	0.0606084	18051.32115	25.93728082
2016	NCC	Graders	500	159406.0884	6.1956929	1.763463002	0.9736214	0.068894552	0.0380372	0.132167187	0.0729705	3622.481927	4.844728636
2016	NCC	Off-Highway Tractors	50	80494.3461	0.9417566	1.173200625	0.1949774	0.110116533	0.0183006	0.266352375	0.0442658	12034.21952	19.69685486
2016	NCC	Off-Highway Tractors	120	102579.7238	1.6880794	1.72844999	0.4040424	0.138921783	0.0324744	0.158020053	0.0369388	8555.784819	14.32121164
2016	NCC	Off-Highway Tractors	175	87632.74721	3.5676488	1.183860525	0.6846285	0.060088941	0.0347495	0.084798906	0.0490394	3458.402504	5.437909349
2016	NCC	Off-Highway Tractors	250	73353.39132	4.7928965	1.0905375	1.0121788	0.037794746	0.0350791	0.065569198	0.0608578	2154.831659	3.549169842
2016	NCC	Off-Highway Tractors	500	206683.4235	7.5008699	1.995748895	1.0288467	0.068689954	0.035411	0.12453747	0.0642014	3879.584495	6.102081483
2016	NCC	Off-Highway Trucks	50	7699.551506	0.6200708	0.125494874	0.1435624	0.013044858	0.0149229	0.029632376	0.0338986	1748.297523	1.172236887
2016	NCC	Off-Highway Trucks	120	9441.552531	1.6941017	0.153544136	0.3913525	0.012366692	0.0315202	0.015370782	0.039177	784.6846247	0.658097902
2016	NCC	Off-Highway Trucks	175	182496.8093	3.1193732	2.560388166	0.6216654	0.141963278	0.0344689	0.215357272	0.052289	8237.191109	6.293061185
2016	NCC	Off-Highway Trucks	250	374353.0963	4.1338688	5.46653827	0.8574848	0.235287882	0.0369074	0.417249478	0.06545	12750.16902	10.77635314
2016	NCC	Off-Highway Trucks	500	1590859.029	7.4030612	19.20147008	1.2692668	0.724410648	0.0478854	1.377405955	0.0910501	30256.00338	23.93831118
2016	NCC	Other Construction Equipment	50	43532.37823	0.9138473	0.641891836	0.1914088	0.057425965	0.0171241	0.123535769	0.0368377	6707.025944	15.21072561
2016	NCC	Other Construction Equipment	120	136243.8942	1.7479415	2.592530402	0.4724681	0.203162774	0.0370248	0.238248043	0.0434188	10974.41425	26.83884424
2016	NCC	Other Construction Equipment	175	74198.19933	3.2590294	1.302132087	0.8124352	0.068476886	0.0427246	0.09701115	0.0605279	3205.503745	8.352592259
2016	NCC	Other Construction Equipment	250	95205.14494	4.6890141	1.499323	1.0489508	0.055281544	0.0386759	0.089370509	0.0625251	2858.709864	7.492766585
2016	NCC	Other Construction Equipment	500	324742.0599	7.7137788	3.961208616	1.3365806	0.145918731	0.0492355	0.246183498	0.0830666	5927.3772	14.55562033
2016	NCC	Pavers	50	5332.654639	0.9258556	0.080015344	0.1973385	0.008157873	0.0201194	0.021661363	0.0534225	810.9449636	2.465408446
2016	NCC	Pavers	120	51604.39919	1.7002335	0.916675499	0.4290187	0.071100072	0.033276	0.083633804	0.039142	4273.358735	11.97777603
2016	NCC	Pavers	175	70097.26721	3.3969354	1.025380109	0.7058459	0.050950996	0.0350734	0.075325372	0.0518521	2905.393746	8.094757731
2016	NCC	Pavers	250	47310.87583	4.5938979	0.569631508	0.7856935	0.014734578	0.0203234	0.024982732	0.0344587	1450.009504	3.492661965
2016	NCC	Pavers	500	17828.23413	6.9547705	0.156090076	0.8649451	0.005206902	0.0288531	0.008061875	0.0446734	360.9248022	0.862892956
2016	NCC	Paving Equipment	50	6629.478934	0.7039383	0.090083095	0.1358743	0.007291527	0.010998	0.014794736	0.0223152	1325.977111	3.035780545
2016	NCC	Paving Equipment	120	30152.91602	1.6313546	0.517442952	0.3976677	0.039559033	0.0304021	0.046486188	0.0357258	2602.388593	6.194633274
2016	NCC	Paving Equipment	175	28403.78058	2.7159342	0.369666054	0.5021014	0.018343987	0.0249158	0.026284696	0.0357014	1472.475624	3.384485067
2016	NCC	Paving Equipment	250	14886.98303	3.9576109	0.197984291	0.7476459	0.006602849	0.0249343	0.010976939	0.0414521	529.6205159	1.230721842
2016	NCC	Paving Equipment	500	20997.73207	6.174823	0.277203372	1.157949	0.009902073	0.0413635	0.01601353	0.0668926	478.7833918	1.107649658
2016	NCC	Rollers	50	109421.6428	0.7707423	1.544282714	0.1545153	0.135501635	0.0135578	0.306989424	0.0307162	19988.73256	62.28648439

2016	NCC	Rollers	120	170967.9074	1.6908519	2.969244464	0.4171341	0.218647169	0.0307166	0.265534733	0.0373036	14236.40181	46.45093751
2016	NCC	Rollers	175	176708.3129	2.7861662	2.250808187	0.5041123	0.104596936	0.0234265	0.148242146	0.0332017	8929.788275	26.85708751
2016	NCC	Rollers	250	27921.34458	4.1470003	0.367451546	0.7752408	0.012540155	0.0264569	0.021283125	0.0449026	947.9675366	3.293793751
2016	NCC	Rollers	500	17644.78765	6.5855902	0.232822466	1.2343603	0.00904372	0.0479473	0.014421778	0.0764603	377.235829	1.3513
2016	NCC	Tractors/Loaders/Backhoes	50	163894.9093	0.7974705	2.347419741	0.1622478	0.204701421	0.0141484	0.465281579	0.0321591	28936.23658	60.38639997
2016	NCC	Tractors/Loaders/Backhoes	120	2638803.338	1.5899299	40.34310734	0.3452861	3.106161555	0.0265848	3.488501434	0.0298572	233679.3101	410.0173437
2016	NCC	Tractors/Loaders/Backhoes	175	456224.8266	2.7216374	6.043184181	0.5121014	0.306289682	0.0259551	0.443857068	0.0376126	23601.51357	45.86841531
2016	NCC	Tractors/Loaders/Backhoes	250	264626.8276	3.8751439	3.530167433	0.7343246	0.115532695	0.0240324	0.204790947	0.0425994	9614.733137	18.34736612
2016	NCC	Tractors/Loaders/Backhoes	500	355425.6362	6.0852824	4.049391316	0.9848283	0.140128514	0.0340798	0.250859072	0.0610099	8223.547715	16.55891874
2016	NCC	Trenchers	50	58015.69756	1.1549505	0.82561119	0.2334706	0.073976618	0.0209195	0.156959107	0.0443857	7072.506598	19.8027775
2016	NCC	Trenchers	120	42016.62482	2.1464263	0.864641182	0.6274361	0.067814669	0.0492104	0.081577012	0.0591972	2756.108919	9.181287749
2016	NCC	Trenchers	175	8576.301019	3.7034105	0.168972785	1.0364716	0.008515782	0.0522354	0.012508606	0.0767272	326.0538741	1.215170437
2016	NCC	Trenchers	250	16797.08753	5.6825654	0.317805964	1.5272541	0.012656465	0.0608221	0.02028349	0.0974747	416.1795617	1.440202
2016	NCC	Trenchers	500	28294.33867	9.2770604	0.349559295	1.6280603	0.01276742	0.0594638	0.020834654	0.0970367	429.4181189	1.305183062
2016	NCC	Rough Terrain Forklifts	50	5571.394157	1.0932282	0.076665206	0.2136899	0.006238084	0.0173875	0.014394154	0.040121	717.5369567	2.829023537
2016	NCC	Rough Terrain Forklifts	120	448576.241	2.0045662	5.164442395	0.3278282	0.286633068	0.0181949	0.335221097	0.0212791	31507.00122	121.2090257
2016	NCC	Rough Terrain Forklifts	175	82431.60643	2.6889626	0.795305739	0.3685224	0.030840966	0.0142908	0.042768761	0.0198178	4316.186463	16.21810907
2016	NCC	Rough Terrain Forklifts	250	6775.480961	4.333414	0.050160063	0.4557083	0.001192576	0.0108346	0.00241699	0.0219586	220.1411076	0.951137224
2016	NCC	Rough Terrain Forklifts	500	2872.646629	7.6908005	0.030859231	1.1735814	0.000680456	0.0258779	0.001280756	0.0487073	52.58984167	0.219493205

*Assumes there is 1.874 pounds/liter of diesel

11. EMFAC 2014 ON-ROAD EMISSION FACTORS

calendar year	season month	sub area	vehicle class	fuel	temp	RH	process	speed time	pollutant	emission rate (g/mi)	emission rate (lb/mi)
2016	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	NOx	0.30014575	0.00066171
2016	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	ROG	0.10072459	0.00022206
2016	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	CO2	314.429231	0.69320142
2016	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	CH4	0.02614413	5.7638E-05
2016	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	PM10	0.00310201	6.8388E-06
2016	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	PM2_5	0.00286829	6.3235E-06
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	NOx	7.20985868	0.0158951
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	ROG	0.22627828	0.00049886
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	CO2	1684.65929	3.71405738
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	CH4	0.01051004	2.3171E-05
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	PM10	0.09544659	0.00021042
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	PM2_5	0.09131762	0.00020132
2016	Annual	Monterey (NCC)	LDT1	Gas			PMTW		PM10	0.008	1.7637E-05
2016	Annual	Monterey (NCC)	LDT1	Gas			PMTW		PM2_5	0.002	4.4093E-06
2016	Annual	Monterey (NCC)	LDT1	Gas			PMBW		PM10	0.03675	8.102E-05
2016	Annual	Monterey (NCC)	LDT1	Gas			PMBW		PM2_5	0.01575	3.4723E-05
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl			PMTW		PM10	0.036	7.9367E-05
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl			PMTW		PM2_5	0.009	1.9842E-05
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl			PMBW		PM10	0.06174	0.00013611
2016	Annual	Monterey (NCC)	T7 Single Construction	Dsl			PMBW		PM2_5	0.02646	5.8335E-05
2019	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	NOx	0.19802675	0.00043658
2019	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	ROG	0.04697309	0.00010356
2019	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	CO2	292.858284	0.64564537
2019	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	CH4	0.0175742	3.8745E-05
2019	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	PM10	0.00238512	5.2583E-06
2019	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	PM2_5	0.002195	4.8392E-06
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	NOx	4.42530896	0.00975619
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	ROG	0.11246069	0.00024793
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	CO2	1635.40311	3.60546553
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	CH4	0.00522351	1.1516E-05
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	PM10	0.02861516	6.3086E-05
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	PM2_5	0.02737728	6.0357E-05
2019	Annual	Monterey (NCC)	LDT1	Gas			PMTW		PM10	0.008	1.7637E-05
2019	Annual	Monterey (NCC)	LDT1	Gas			PMTW		PM2_5	0.002	4.4093E-06
2019	Annual	Monterey (NCC)	LDT1	Gas			PMBW		PM10	0.03675	8.102E-05
2019	Annual	Monterey (NCC)	LDT1	Gas			PMBW		PM2_5	0.01575	3.4723E-05
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl			PMTW		PM10	0.036	7.9367E-05
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl			PMTW		PM2_5	0.009	1.9842E-05
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl			PMBW		PM10	0.06174	0.00013611
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl			PMBW		PM2_5	0.02646	5.8335E-05
2019	Annual	Monterey (NCC)	LDT1	Gas	58	84	RUNEX	40	CO	1.9440589	0.00428594
2019	Annual	Monterey (NCC)	T7 Single Construction	Dsl	58	84	RUNEX	40	CO	0.47363626	0.00104419